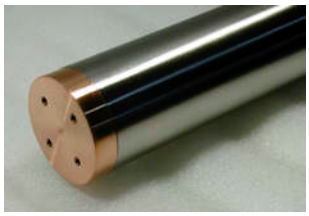
UHV AND HIGH VACUUM CHAMBERS

15.1 UHV AND HV CHAMBERS

-> Page 15.2

Stainless Steel UHV Chambers
Stainless Steel HV Chambers
Chamber Options



15.2 SPECIAL FABRICATIONS

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Special vacuum Fabrications
Vacuum Equipment Assembly
Non-magnetic Chamber
Mu-metal Shields
Mu-metal Chambers

15.3 STANDARD CHAMBERS

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Fast Entry Lock (FEL) Chambers
Complete Load Locks
Variation of Standard Fittings

Chamber Types

Geometry	Material	Application
Cylinder	Stainless Steel, Aluminium, Mu-Metal	General Purpose UH and UHV
Sphere	Stainless Steel, Aluminium, Mu-Metal	Surface Science AFM/ STM
Cube with door	Stainless Steel, Aluminium	HV, Box coating, deposition

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UHV and High Vacuum Chambers

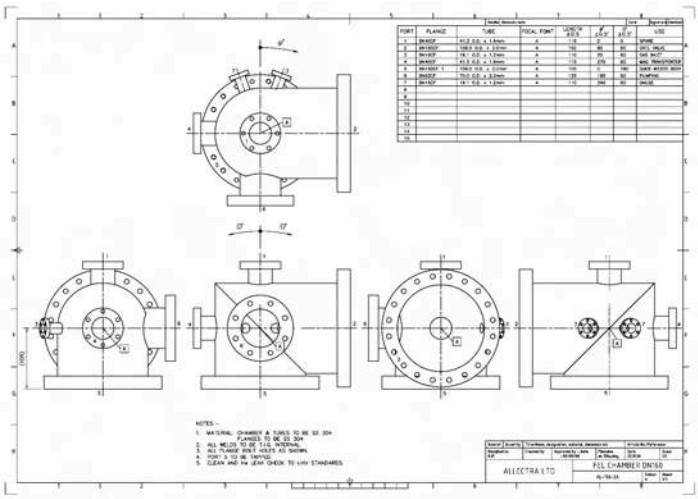
Allectra offers custom built chambers for UHV and HV systems

- Stainless Steel 316L or 304
- Standard design available
- Engineering drawings produced from customer´s sketches or plans
- Chambers are cleaned to UHV standards using modern environmentally friendly processes

Spherical Chamber made from Stainless Steel Spinnings -typical application Surface Science

General Specification for SS Chamber

Vacuum	UHV 5 x 10^{-12} mbar
	HV 5 x 10^{-9} mbar
Material Body	SS304 (1.4301) or 316L (1.4404)
Material CF Flanges	SS 316L
	option 316LN (1.4429)
CF Flange orientation	
Fixed Flange bolt holes straddle the vertical axis	
Wall Thickness	
diameters up to 160	2 mm
diameters over 160	3.2 mm
Large vessels	5.0 mm
Standard Tolerances	+/- 0.5mm linear
	+/-0.5° angular
(Finer tolerances on request)	
Welding	TIG internal welds or full penetration if internal welding is not possible
Finish	UHV clean and hand polish – Electro-polish option



Allectra will produce detailed engineering drawings based on customer's sketches. 3D compatibility check is included.

Chamber Options

- Vacuum - HV or UHV
- Electropolish
- Spherical Chambers for Surface Science or UHV STM/AFM
- Box or Cube shape chambers with a full width O-Ring sealed door
- Mu-metal construction or Stainless Steel with Mu-metal shields
- Flanges CF, KF, ISO(K) or custom
- Ports focussed on chamber centre or another defined point, straight or angled
- Water cooling - either double wall vessel or brazed-on cooling channels
- Mounting bench
- Blanking flanges, pump down and seal off with dry N_2 at atmospheric pressure
- Vacuum annealing

A Special Purpose high dimensional accuracy chamber with Custom flanges

Send us your sketch for an initial 3D check and a quote.

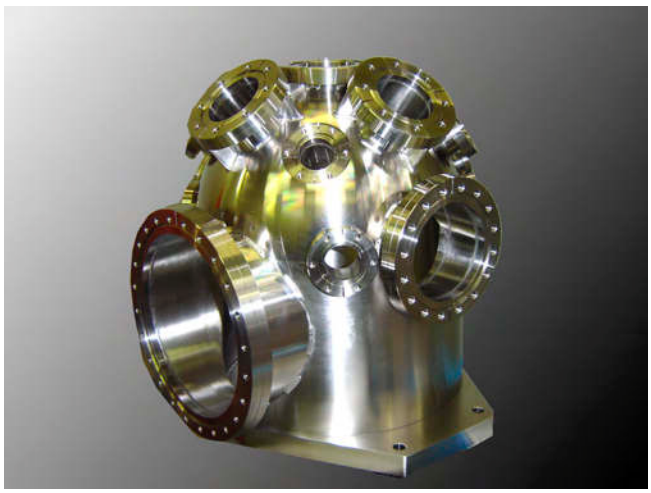
...Standard CF fittings 4 and 6 way crosses: Sec. 11.....

Special Vacuum Fabrications/ Vacuum Instrument Assembly/ Non-magnetic Chambers

Special Vacuum Fabrications

Allectra can design and build special purpose equipment or alternatively build HV or UHV items to customers drawings. If required, fully detailed manufacturing drawings can be prepared from sketches.
Some examples of special equipment built by Allectra:

- Differentially pumped beamline element for SOLEIL synchrotron
- Miniature rectangular UHV chamber for an Industrial application
- Stepper Motor controlled shutter mechanism for a Synchrotron application
- Chamber including pumping system



Small industrial chamber with integrated Sub-D feedthrough

Non-magnetic Chambers

Allectra offers a number of solutions for creating a very low magnetic field environment.

- SS chambers 316L with 316LN flanges
- Aluminium-chambers with Bi-Metal flanges (see p. 156)
- SS chambers with Mu-metal shields
- Mu-metal chambers

Mu-metal Shields

Allectra Stainless Steel Cylindrical Chambers can be supplied with internal mu-metal shielding which with proper design will reduce the residual magnetic field at the centre to less than 5 milli-Gauss
In order to achieve this care must be taken with the port sizes and position to minimise field ingress. Allectra can advise on design suitability if required.

For minimum magnetic field , the very low magnetic permeability stainless steel grade 316LN is recommended for the Flanges.

Mu-metal Chambers

UHV chambers can be constructed entirely from Mu-metal except for the Flanges. This method yields a very low residual magnetic field at the centre. However, the manufacturing technique is more involved and Mu-metal chambers are generally more expensive than SS chambers with shields

Mu-metal chambers are used typically for Surface Science Analysis Chambers where techniques like EELS are used. They are constructed from 5mm Mu-metal to obtain sufficient strength. Careful design is essential because Mu-metal is a soft alloy and not as strong as Stainless Steel.

Large Mu-Metal Chamber

See Section 16 for examples of Al chambers.

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Fast Entry Lock (FEL) Chamber

Modified Fittings

Allectra offers a standard design of Fast Entry Lock chamber which is very versatile and which provides the maximum access and viewing diameters to the sample carrier position.

Also available are a range of modified standard fittings like 4 way crosses which can be easily and cheaply fitted with extra ports or simple modifications.

Fast Entry Lock Chamber with Quick Access Door including Viewport

Specification FEL Chamber

Vacuum	UHV 5 x 10^{-12} mbar
Material	Stainless Steel
Door Seal	Viton
Hinge	Aluminium
Viewport	7056 glass
Viewport Seals	Kovar - welded seal
Temp.	200°C max.

FEL Chamber includes the Quick Access Door.

Quick Access Door

Flanges	Access Ø	View Ø
CF63	60 mm	63 mm
CF100	95 mm	90 mm
CF160	150 mm	135 mm

(For specification of QADs see Sec. 9)

FEL Chamber Construction

FEL Chambers are designed to give the maximum opening diameter for easy access and the maximum view diameter if a viewport door is fitted.
They are based on a 316L Stainless steel Sphere with ports for;

Port 1	Pump
Port 2	Tapped for Door
Port 3	Magnetic transporter
Port 4	Gate valve
Port 5	40CF for Gauge or viewport
Port 6	16CF for gas inlet
Port7	16CF for Gauge or spare

Complete Load Locks

include Fast Entry Lock Chamber and Door with viewport
UHV Gate Valve with Viton seal.
Standard Magnetic transporter with 800mm travel
Blanking flanges for unused ports.

Modified Standard Fittings

Allectra offers a cost effective way of building a custom vacuum chamber. Starting with a Standard CF or ISO fitting (Sec. 13), ports can be added, taken away or port sizes changed as required. In this case the price is the cost of the standard fitting plus the cost of the changes . If these are quite simple, usually no drawing is required.

Please ask Sales Office for details.

FEL Chambers Stainless Steel with Viton sealed DOOR & Viewport

DOOR (2)*	GV (4)*	PART NUMBER
63CF	63CF	640-LLC-63-63-VP
100CF	63CF	640-LLC-100-63-VP
100CF	100CF	640-LLC-100-100-VP
100CF	160CF	640-LLC-100-160-VP
160CF	160CF	640-LLC-160-160-VP

* Port numbers -see Table on left

Complete Load Lock Systems including Gate Valve (GV) with Viton sealed DOOR, Viewport & 600mm travel

DOOR (2)*	GV (4)*	PART NUMBER
63CF	63CF	640-LLS-63-63-VP-600
100CF	63CF	640-LLS-100-63-VP-600
100CF	100CF	640-LLS-100-100-VP-600
160CF	100CF	640-LLS-160-100-VP-600
160CF	160CF	640-LLS-160-160-VP-600

* Port numbers - see Table on left

Load Lock Systems can be supplied without Viewport or Gate Valve. If required, Customer's own fittings can be re-used to save cost. Please ask Sales Office for details.

...Quick Access doors: Sec. 9.....Magnetic Transporters: Sec. 9....